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09/818,073	03/27/2001	William A. Wojtczak	396-CIP	9775

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 12/19/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/818,073

Applicant(s)

WOJTCZAK ET AL.

Examiner

Lynette T. Umez-Eronini

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 14-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 14-39 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. 09/343,313.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 5. 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-13 and 40 are, drawn to cleaning formulation, classified in class 252, subclass 79.1.
  - II. Claims 14-39 are, drawn to a method of etching, classified in class 438, subclass 706.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the process for using the product as claimed can be practiced with another materially different product that does not requires metal chelating agents.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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4. Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Robert A. McLauchlan on December 9, 2002 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-13 and 40. Affirmation of this election must be made by applicant in replying to this Office action. Claims 14-39 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Claim Objections***

7. Claim 10 is objected to because of the following informalities: "X-CHR-Y" lacks the proper number of molecules surrounding the carbon ("C") atom. Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claim 40 is rejected under 35 U.S.C. 102(b) as being anticipated by Ohmi et al (US 4,795,582).

Ohmi teaches a treating composition, which comprises a mixture comprising of:

ammonium fluoride (same as applicant's fluoride source), water, and at least compound incorporated in the mixture and selected from the group consisting of surfactants consisting of aliphatic amines (same as applicants organic amine) and carboxylic acids (column 2, lines 19-26).

***Claim Rejections - 35 USC § 103***

10. Claim 1, 2, 4, 6, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi ('582) in view of Ilardi et al. (US 5,466,389).

As pertaining to claim 1, Ohmi teaches a treating composition, which comprises a mixture of: 15 to 40 % by weight (column 3, lines 36-37) ammonium fluoride (same as applicant's fluoride source), (column 2, lines 19-21); an example of surfactants that are used single, or at least two of them in admixture in an amount of 50-ppm to 10,000-ppm (column 3, lines 23-27), which is equivalent to 0.005% to 1% and which is an aliphatic amines (same as applicant's organic amine), (column 2, lines 19, 20, and 22-26); and

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water (column 2, lines 19, 20, and 22). Ohmi's treating composition further reads on a cleaning formulation with 0% metal chelating agent.

Ohmi differs in failing to teach a nitrogenous component, **in claims 1, 4 and 8 and 9.**

Ilardi teaches a cleaner composition comprising a metal chelating agent such as nitrilotriacetic acid (NTA) (column 4, lines 5-15), which is the same as applicant's nitrogenous component and that NTA can be replaced with EDTA (column 65-67), which is present in 0.1% (column 11, lines 24-26) and which reads on a nitrogenous component containing 0.5 - 40%.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi by using Ilardi's metal chelating agent for the purpose of increasing the capacity of the formulation to retain metals in solution (Ilardi, column 4, lines 5-8).

Ohmi in view of Ilardi differs in failing to recite the weight percent of water, **in claim 1.**

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by varying the concentration of water in a cleaning composition since water is used as a diluent and to make up the based concentration of 100%. Hence, it can be seen that the concentration of a composition is a so-called "result effective variable." It

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has been held that the discovery of an optimum value for result effective variables is within the purviews of routine experimentation by the person of ordinary skill in the art.

In re Boesch, 617, F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

Ohmi's composition includes ammonium fluoride (column 2, lines 19-21), which read on said fluoride source as **in claims 2 and 6**.

11. Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Ilardi as applied to claim 1 above, and further in view of Lee (US 5,334,332).

Ohmi ('582) in view of Ilardi ('389) differs in failing to specify one of the said organic amine(s) as recited **in claims 3 and 7**.

Lee teaches a cleaning composition that contains alkanolamines such as triethanolamine (same as applicant's organic amine), (column 7, lines 15-38).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the organic amine as taught by Lee for the purpose of reducing metal oxides by complexing the metal with the organic amine, which serves as a ligand (Lee, column 6, line 42-49).

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12. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi ('582) in view of Ilardi ('389) as applied to claim 1 above, and further in view of Wojtczak et al. (WO 98/00244).

Ohmi in view of Ilardi differs in failing to specify at least one of the metal chelating agents as recited in claim 4.

Wojtczak teaches a cleaning solution containing 2,4-pentanedione (Abstract), which is the same as applicant's metal chelating agent (page 2, line 2).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the chelating agent as taught by Wojtczak for the purpose removing inorganic residues such as metal oxides (from wafers prior to further fabrication steps (Wojtczak, page 2, lines 5-9 and 23-24).

13. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi (US '582) in view of Ilardi (US '389) as applied to claim 1 above, and further in view of Wojtczak (WO 98/00244) and Hidetoshi et al. (English Translation of JP 09-62013).

Ohmi in view of Ilardi differs in failing to teach the cleaning formulation includes a metal chelating agent having the formula, X-CHR-Y, as in **claim 10** and examples of functional groups that are represented by X, Y, and Z in CHR-Y, in **claim 11**.

Wojtczak teaches a cleaning formulation that contains a chelating agent having the formula comprising CHR-Y (same as applicant X-CHR-Y), (page 2, lines 26 and



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page 7, lines 4-10, Note: the X-C bond is not shown) and also discloses examples of functional groups that are represented by X, Y, and Z in CHR-Y (page 7, lines 8-10), **as in claim 11.**

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi by using the chelating agent as taught by Wojtczak for the purpose of removing inorganic residues such as metal oxides from wafers prior to further fabrication steps (Wojtczak, page 2, lines 2-9 and 23-24).

Ohmi in view of Ilardi and further in view of Wojtczak differs in failing to teach a cleaning formulation wherein said fluoride source comprises a compound having the general formula  $R_1R_2R_3R_4NF$ , **in claim 10.**

Hidetoshi teaches tetramethylammonium fluoride is used as a cleaning agent for semiconductor devices ([0010]).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Ohmi in view of Ilardi and further in view of Wojtczak by using fluoride source that comprises a compound having the general formula  $R_1R_2R_3R_4NF$  as taught by Hidetoshi for the purpose of preventing corrosion of conductive materials on a semiconductor device (Hidetoshi, ([0007])).

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***Allowable Subject Matter***

14. Claims 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-972-9311 for After Final communications.

*Lynette T. Umez-Eronini*

ltue

December 15, 2002